

7 GHz to 30 GHz, 2-Channel Microwave Upconverter

FEATURES

- ▶ Dual-channel 7 GHz to 30 GHz transmitter
- ▶ Dual independent channels
- ▶ Integrated upconversion mixers
- ▶ Integrated LO amplifiers
- ▶ Integrated IF filters
- ▶ Integrated driver amplifiers
- ▶ Single 5 V supply
- ▶ 50 Ω matched input and output
- ▶ 17.00 mm x 14.00 mm, 204-ball BGA_CAV

APPLICATIONS

- ▶ Electronic warfare
- ▶ Satellite communication
- ▶ Phased-array radar transmitters

GENERAL DESCRIPTION

The ADMFM2001 is a dual-microwave upconverter, system-in-package (SiP) module, with an input intermediate frequency (IF) frequency range covering 0.5 GHz to 5.6 GHz and with output RF and local oscillator (LO) ranges from 7 GHz to 30 GHz. There are dual LO feeds with integrated amplifiers to drive the mixers in each channel. Each upconversion path consists of two low-pass filters, an RF amplifier, a mixer, and an RF driver amplifier.

Fabricated using a combination of surface mount and bare die components, the ADMFM2001 comes in a compact, shielded, 17.00 mm x 14.00 mm, 204-ball pre molded cavity ball grid array [BGA_CAV] and operates over a temperature range of -40°C to $+85^{\circ}\text{C}$.

FUNCTIONAL BLOCK DIAGRAM

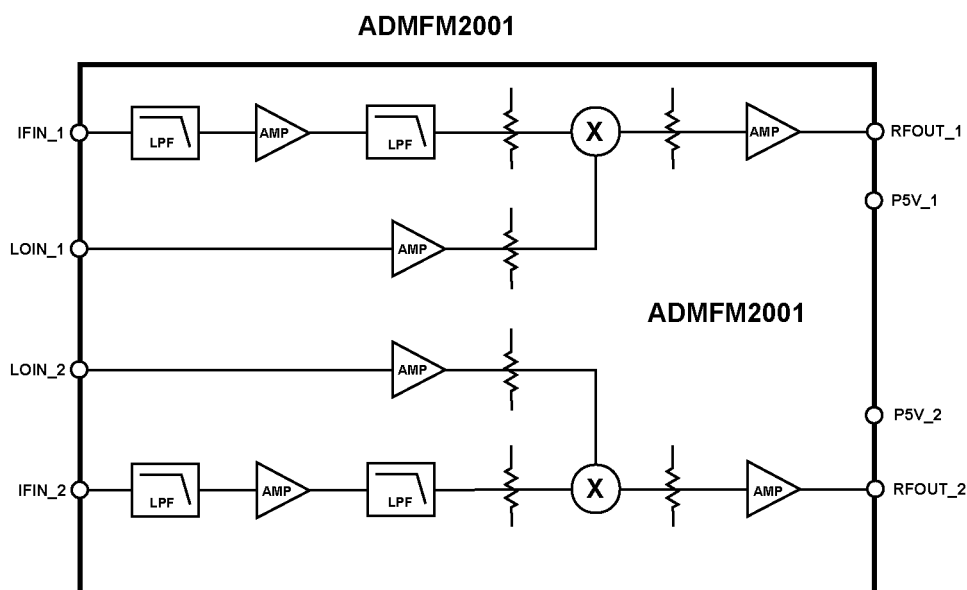


Figure 1. ADMFM2001 Block Diagram

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SPECIFICATIONS

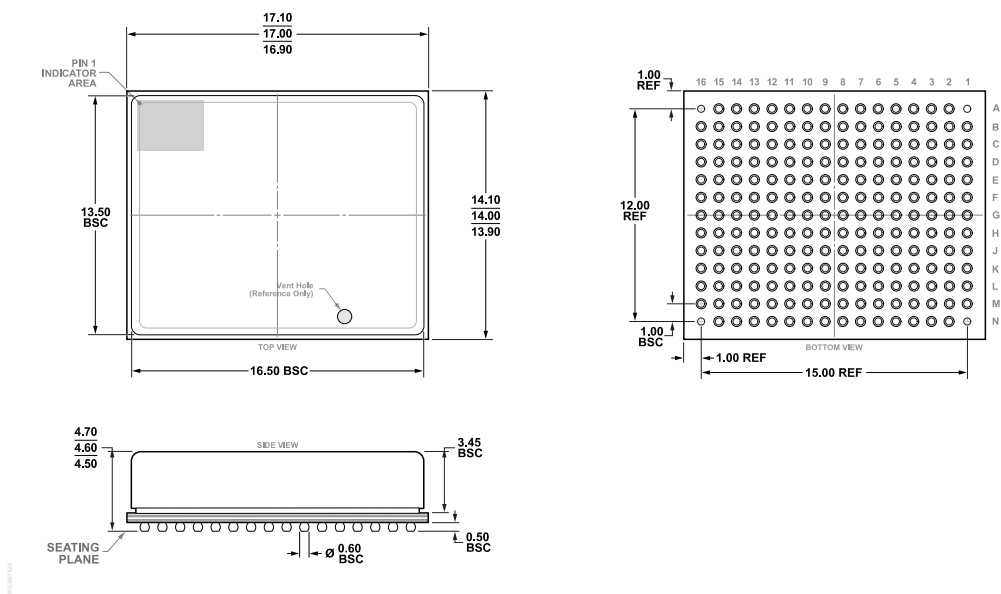
Supply voltage ($P5V_1 = P5V_2$) = 5 V, $T_A = 25^\circ\text{C}$, IF input power = -20 dBm, IF frequency = 3 GHz, LO input power = +10 dBm, IF input resistance (R_{IF}) = RF output resistance (R_{RF}) = LO input resistance (R_{LO}) = 50 Ω , unless otherwise noted.

Table 1. Specifications

Parameter	Test Conditions/Comments	Min	Typ	Max	Unit
FREQUENCY RANGE					
RF Output		7		30	GHz
IF Input		0.5		5.6	GHz
LO Input		12		30	GHz
DYNAMIC PERFORMANCE					
Gain	$f_{IF} = 2\text{ GHz}$		11		dB
	$f_{IF} = 3\text{ GHz}$		10.3		dB
	$f_{IF} = 5\text{ GHz}$		6.7		dB
Gain Flatness	Over any 3 GHz of bandwidth				
	$f_{IF} = 2\text{ GHz}$		2		dB p-p
	$f_{IF} = 3\text{ GHz}$		3		dB p-p
	$f_{IF} = 5\text{ GHz}$		3		dB p-p
Gain Variation over Temperature			0.05		dB/ $^\circ\text{C}$
Output Third-Order Intercept (OIP3)	$\Delta f_{RF} = 1\text{ MHz}$				
	$f_{IF} = 2\text{ GHz}$		15.6		dBm
	$f_{IF} = 3\text{ GHz}$		15.6		dBm
	$f_{IF} = 5\text{ GHz}$		14		dBm
Output 1 dB Compression Point (OP1dB)	$f_{IF} = 2\text{ GHz}$		10.2		dBm
	$f_{IF} = 3\text{ GHz}$		10.2		dBm
	$f_{IF} = 5\text{ GHz}$		7.6		dBm
Noise Figure ¹	Single sideband				
	$f_{IF} = 2\text{ GHz}$		7.3		dB
	$f_{IF} = 3\text{ GHz}$		7.8		dB
	$f_{IF} = 5\text{ GHz}$		10.7		dB
Isolation					
	LO to RF		-77		dB
	LO to IF		-32		dB
	RF to IF		-80		dB
	RF to LO		-80		dB
	Channel-to-Channel		-60		dB
LO INPUT					
Input Power Range	Recommended	9	10	11	
INPUT/OUTPUT CHARACTERISTICS					
Return Loss					
IF Input	0.5 GHz to 5.6 GHz		-10		dB
RF Output	7 GHz to 30 GHz		-10		dB
LO Input	12 GHz to 30 GHz		-10		dB
POWER INTERFACE					
Supply Voltage		4.75	5	5.25	V
Supply Current	Both channels enabled, LO drive at 10 dBm		556		mA
	Single channel enabled, LO drive at 10 dBm		278		mA
Power Consumption	Both channels enabled, LO drive at 10 dBm		2.78		W
	Single channel enabled, LO drive at 10 dBm		1.39		W

¹ Does not include IF and LO noise contribution.

OUTLINE DIMENSIONS



**Figure 2. 204-Ball Pre Molded Cavity Ball Grid Array [BGA_CAV]
(BV-204-1)**

Dimensions shown in millimeters